

## ABSTRACT

A method of defining a gate structure for a MOSFET device featuring the employment of dual anti-reflective coating (ARC) layers to enhance gate structure resolution, and featuring a dry procedure for removal of all ARC layers avoiding the use of hot phosphoric acid, has been developed. After formation of a polysilicon layer on an underlying silicon dioxide gate insulator layer, a capping silicon oxide, a dielectric ARC layer, and an overlying organic ARC layer are deposited. A photoresist shape is formed and used as an etch mask to allow a first anisotropic RIE procedure to define the desired gate structure shape in the dual ARC layers and in the capping silicon oxide layer. After removal of the photoresist shape and the overlying organic ARC layer a second anisotropic RIE procedure is used to define a desired polysilicon gate structure, with the second anisotropic RIE procedure also resulting in the removal of the dielectric ARC shape. A final hydrofluoric acid type solution is then used to remove the capping silicon oxide shape as well as to remove the portions of the silicon dioxide gate insulator layer not covered by the polysilicon gate structure.